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BOILERPLATE NO. 10, COMMAND MODULE WATER EGRESS AND FLOTATION TEST SPECIFICATION PROJECT APOLLO SPACECRAFT

(Unclassified)

NAS 9-150

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Approved by

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1. SCOPE

1.1 Scope. - This specification covers the requirements the Command Module Water Egress and Flotation Test Boilerplate. The boilerplate shall be used to test the spacecraft design for water stability, flotation requirements, and crew egress.

2. APPLICABLE DOCUMENTS

2.1 General. - The following documents shall form a part of this specification:

Government Documents

Air Force

ARDCM-80-1, Volume 1	Handbook of Instructions for Aircraft Designers

National Aeronautics and Space Administration

NCP200-2	Quality Assurance Provisions for Space Contractors, dated 15 December 1961

Non-Government Documents

Space and Information Systems Division, North American Aviation, Inc.

SID 62-240	Preparation for Delivery of Airborne Equipment, General Requirements For

3. REQUIREMENTS

3.1 General. - The configuration of the boilerplate shall be similar to the prototype command module configuration.

3.2 Components. -

3.2.1 Arrangement. - All equipment in the boilerplate shall be placed in positions similar to equipment positions in the prototype command module. The equipment shall be prototype equipment if available, otherwise, simulated equipment shall be used. The boilerplate shall include:

(a) Cabin Housing

(b) Main and Emergency Hatches

(c) Air Lock

(d) Lower Compartment

(e) Restraint and Support Equipment

(f) Pitch and Roll Recorders

(g) Crew Emergency Equipment

(h) Insulation and Ablative Material

(i) Electrical Power Supply System

3.2.1.1 Cabin Housing. - The cabin housing of the boilerplate shall be similar to the cabin housing of the prototype command module.

3.2.1.2 Main and Emergency Hatches. - The main and emergency hatches of the boilerplate shall be similar in location and operation to those in the prototype command module.

3.2.1.3 Air-Lock. - The air-lock of the command module shall be simulated in the boilerplate.

3.2.1.4 Lower Compartment. - The lower compartment of the boilerplate, with earth impact attenuation system, shall be similar to the lower compartment of the prototype command module.

3.2.1.5 Restraint and Support Equipment. - Restraint and support equipment shall be installed in the boilerplate to accommodate the crew during testing.

3.2.1.6 On-Board Recorders. - Recorders for pitch and roll shall be installed in the boilerplate to determine the stability of the command module configuration.

3.2.1.7 Crew Emergency Equipment. - Crew emergency equipment shall be installed in the boilerplate to support the crew during testing.

3.2.1.8 Insulation and Ablative Material. - All insulation and ablative material shall be installed in the boilerplate.

3.2.1.9 Electrical Power Supply System. - An electrical power supply (battery) system shall be installed in the boilerplate.

3.2.2 Equipment. - The equipment for the boilerplate shall include the equipment listed in Appendicies I-A and I-B.

3.3 Performance. -

3.3.1 General. - The boilerplate shall be capable of withstanding a seven-day flotation period at sea. The complete boilerplate shall be tested for pitch and roll attitudes in a variety of sea-state conditions. A crew shall qualify the egress, flotation and water stability requirements of the boilerplate.

3.4 Design and Construction. -

3.4.1 General. - The boilerplate shall be constructed of the materials necessary to insure structural soundness. ARDCM-80-1, Volume 1, shall be used for guidance and reference material in the design and construction of the boilerplate.

3.4.2 Weight. - The boilerplate shall have a mass and center of gravity similar to the mass and center of gravity of the prototype command module.

3.4.3 Water Protection. - The boilerplate shall be watertight.

3.5 Ground Support Equipment. -

3.5.1 General. - Ground support equipment shall be required to transport, demonstrate and test the boilerplate. The requirements for ground support equipment are not a part of this specification.

4. QUALITY ASSURANCE PROVISIONS

4.1 General. - Quality assurance provisions shall be in accordance with the applicable portions of NASA Bulletin NCP200-2.

4.2 Inspection and Tests. - Inspections and tests to determine conformance of the boilerplate to contract and specification requirements shall be conducted prior to submission of the boilerplate to NASA or in the presence of a NASA representative. Results of inspection tests on major components shall be submitted to NASA for review. Other acceptance test data relative to this specification shall be maintained and made available for review to NASA upon request.

5. PREPARATION FOR DELIVERY

5.1 Airborne Equipment. - Airborne equipment shall be prepared for delivery in accordance with Specification SID 62-240.

5.2 Transportation. - Provisions shall be included to transport the boilerplate to ocean and tank testing sites.

6. NOTES

6.1 Definitions. - A boilerplate is a simulated module for predevelopmental and developmental tests loading to the design of a prototype module.

Appendix I-A

Government-Furnished Property, Contractor-Installed

Item No.	Quantity	Description	Part No.
1	1	3-Man Dingy	
2	3	Pressure Suits	

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Appendix I-B

Contractor-Furnished Equipment, Contractor-Installed

Landing System

Item No.	Quantity	Description	Part No.
1	7	Impact Air Bags, Large	
2	4	Impact Air Bags, Pillow	
3		Tension Straps	

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Appendix I-B

Contractor-Furnished Equipment, Contractor-Installed

Item No.	Quantity	Power System Description	Part No.
1	1	Battery-Main	

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Appendix I-B

Contractor-Furnished Equipment, Contractor-Installed

Item No.	Quantity	Structure System Description	Part No.
1	1 Set	Insulation and Ablative Material	
2	1 Set	Air Lock Mechanism	

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Appendix I-B

Contractor-Furnished Equipment, Contractor-Installed

Item No.	Quantity	Crew System Description	Part No.
1	1 Set	Restraint and Support System	

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Appendix I-B

Contractor-Furnished Equipment, Contractor-Installed

Instrumentation

Item No.	Quantity	Description	Part No.
1	1 Set	Recorders	

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Appendix I-B

Contractor-Furnisher Equipment, Contractor-Installed

Communications

Item No.	Quantity	Description	Part No.
1	1	VHF Transceiver	
2	1	Intercomm.	
3	1	VHF Rescue Antenna	